Technical Impracticability Decisions for Ground Water at CERCLA Response Action and RCRA Corrective Action Sites

Background: The U.S. Environmental Protection Agency (EPA) has established two processes under separate environmental laws that are designed to address releases of hazardous substances, wastes, or constituents into the environment. First, under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) EPA issued the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). To guide response actions, EPA codified several programmatic expectations in the NCP. These include an expectation that contaminated ground water will be returned to its beneficial uses wherever practicable [40 CFR 300.430(a)(1)(iii)(F)]. In restoring ground water, CERCLA section 121 requires that remedial actions attain cleanup levels that comply with Federal and more stringent state standards that are legally applicable or relevant and appropriate requirements (ARARs). Second (and consistent with the CERCLA program), under the Resource Conservation and Recovery Act (RCRA) corrective action program, EPA directs cleanups to reflect available or site-specific, risk-based media cleanup standards that ensure usable ground water is returned to its maximum beneficial uses wherever practicable.

Regardless of the governing authority, in certain situations, remediation of contaminated ground water to desired cleanup levels may be technically impracticable from an engineering perspective. As part of its first set of Superfund Administrative Improvements, EPA issued integrated CERCLA/RCRA guidance [Reference 1] that outlined an approach to (1) evaluating the technical impracticability of attaining ground water cleanup levels, and (2) modifying ground water cleanup levels and establishing alternative remedial strategies where restoration is determined to be technically impracticable. This guidance promotes "the careful and realistic assessment of technical capabilities at hand . . . . [and] provides consistent guidelines for evaluating technical impracticability and for maintaining protectiveness at sites where ground water cannot be restored within a reasonable time frame." To date, however, few Technical Impracticability (TI) Evaluations have been submitted to EPA or state agencies, and even fewer TI waivers (under CERCLA) or TI determinations (under RCRA) have been granted.

Statutes: The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended. The Resource Conservation and Recovery Act (RCRA) as amended.

Regulations: National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 *CFR* Part 300
Proposed 40 *CFR* Part 264, Subpart S, "Corrective Action for Releases From Solid Waste Management Units at Hazardous Waste Management Facilities; Proposed Rule," July 27, 1990 Federal Register (55 FR 30798)

References:

1. EPA, 1993. *Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration*, Interim Final, OSWER Dir. 9234.1-25, Office of Solid Waste and Emergency Response, Washington, DC
2. May 1, 1996 Federal Register (61 FR 19451), *Corrective Action for Releases From Solid Waste Management Units at Hazardous Waste Management Facilities; Advanced Notice of Proposed Rulemaking*
3. National Research Council, 1994. *Alternatives for Ground Water Cleanup*, National Academy Press, Washington,DC
4. EPA, 1995. *Superfund Groundwater RODs: Implementing Change This Fiscal Year* (memorandum dated July 31, 1995); Office of Solid Waste and Emergency Response, Washington, DC
5. EPA, 1994. *DNAPL Site Characterization*, OSWER Dir. 9355.4-16FS, R.S. Kerr Environmental Research Laboratory and Office of Solid Waste and Emergency Response, Washington, DC
6. EPA, 1995. *Presumptive Response Strategy and Ex-Situ Treatment Technologies for Contaminated Ground Water at CERCLA Sites, Final Guidance*; OSWER Dir. 9283.1-12, Office of Solid Waste and Emergency Response, Washington, DC
7. DOE, 1995. *Guide to Ground Water Remediation at CERCLA Response Action and RCRA Corrective Action Sites*, DOE/EH-0505, Office of Environmental Policy and Assistance, Washington, DC
8. EPA, 1996. *Superfund Reforms: Updating Remedy Decision,*; OSWER Dir. 9200.0-22, Office of Emergency and Remedial Response, Washington, DC
9. EPA, 1997. *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites*, OSWER Dir. 9200.4-17, Office of Solid Waste and Emergency Response, Washington, DC
10. EPA, 1997. *Rules of Thumb for Superfund Remedy Selection*, OSWER Dir. 9355.0-69, Office of Solid Waste and Emergency Response, Washington, DC
11. March 8, 1990 Federal Register (55 FR 8730-8731), *National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule*

What is a technical impracticability decision?

A technical impracticability (TI) decision represents a regulators' concurrence with a finding that restoration of ground water, for example, to ARAR- or risk-based cleanup levels [e.g., maximum contaminant levels (MCLs)] cannot be achieved using currently available or new and innovative methods or technologies. As a result, the owner/operator will not be required to meet these levels, but may be required to meet an alternative level or achieve an alternative remedial goal. Furthermore, a TI decision applies only to that portion of the contaminated ground water for which restoration to ARARs or risk-based levels is determined to be technically impracticable from an engineering perspective.

Historically, what element of site environmental restoration has been the primary focus of technical impracticability decisions?

Congress formally recognized TI in the CERCLA statute [CERCLA 121(d)(4)(C)] and EPA incorporated the concept into both the final NCP [40 *CFR* 300.430(f)(1)(ii)(C)] and the 1990 RCRA, Subpart S proposal [proposed 40 *CFR* 264.525(d) and 264.531]. Although TI decisions may be made for any medium, contaminated ground water has received the most attention. [Reference 2] For example, in the 1988 NCP proposal (53 FR 51434), EPA explicitly recognized that it may be impracticable to actively restore ground water. Since that time, EPA has conducted studies, issued guidance, and prepared policy interpretations focusing on ground water remediation systems and site conditions (i.e., factors) that limit ground water restoration potential (i.e., the likelihood that remediation will achieve ARAR- or risk-based cleanup levels).

What types of site conditions may inhibit the ability to restore ground water?

As noted in the December 21, 1988, Federal Register (53 FR 51434), EPA described four site conditions that could inhibit ground water restoration: (1) widespread plumes resulting from non-point sources; (2) contaminant constraints (e.g., the presence of dense non-aqueous phase liquids [DNAPLs]); (3) hydrogeological constraints (e.g., aquifers with very low transmissivity, or aquifers with fractured bedrock or karst formations; and (4) physicochemical limitations (e.g., interactions between contaminants and the aquifer material such as sorption to soil). EPA has continued focusing on two broad types of site conditions that may inhibit the potential for ground water restoration: contaminant-related factors and hydrogeologic factors (numbers 2 and 3 above). Recent studies indicate that complex site conditions are more common than originally expected. [Reference 3] Examples of factors that contribute to complex site conditions which may limit ground water restoration potential are noted in Figure 1. Sites whose factors consistently rank on the "Increasing difficulty" side of the scale should be viewed as potential candidates for TI evaluations.

How might the presence of DNAPLs alter a site's ground water restoration strategy?

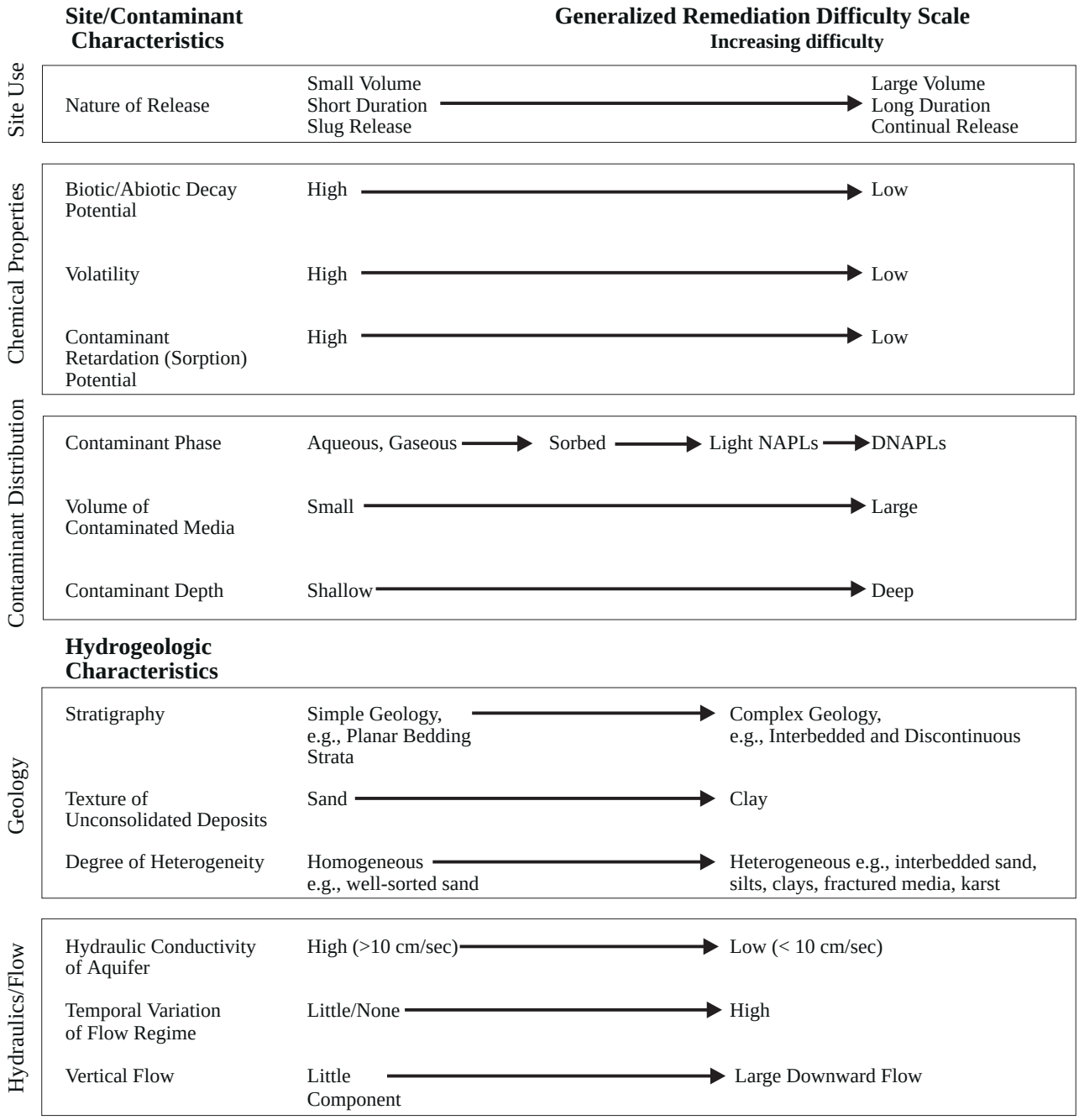
The difficulty of restoring contaminated aquifers is greatest when DNAPLs [e.g., chlorinated solvents, creosote and coal tars/wastes, polychlorinated biphenyls (PCBs), mercury, and certain pesticides that are immiscible in and denser than water] are present (see Figure 1). In fact, in a recent memorandum, EPA restates its policy that it expects to include TI ARAR waivers in Records of Decision (RODs) for sites or portions of a site where DNAPLs are present. Specifically, EPA states "OSWER expects that Technical Impracticability waivers will generally be appropriate for [DNAPL sites]. . . . RODs addressing DNAPL contamination that do not follow the policy in favor of TI waivers . . . must include written justification for that departure from this policy." [Reference 4]

In most cases, investigation strategies for confirming the presence of DNAPLs should be conducted in phases. [Reference 5] During the initial phase, a site conceptual model identifying sources (i.e., concentrations and locations) of contaminants, potential exposure pathways, and receptors is formulated using site-specific information. [Further assistance on developing conceptual models that address human health and ecological risk

assessments can be obtained by accessing a DOE computer-based graphics tool -- *Site Conceptual Exposure Model (SCEM) Builder*, which is available electronically by accessing the Office of Environmental Policy and Assistance Website at ***http://tis-nt.eh.doe.gov/oepa/loadtools.html***]. In the second phase, a data collection program, based on the conceptual model, is designed to test, validate, and improve the model. Data obtained using pilot studies and data gathered following implementation of early actions to control plume migration or remove contaminant sources should also be considered in the conceptual site model and can be very useful when evaluating a site's restoration potential.

Figure 1. Examples of Factors Affecting Ground Water Restoration Potential

Certain site characteristics may limit the effectiveness of subsurface remediation. The examples listed below are highly generalized. The particular factor or combination of factors that may critically limit restoration potential will be site-specific.



SOURCE: Figure 1 is taken from Reference 6.

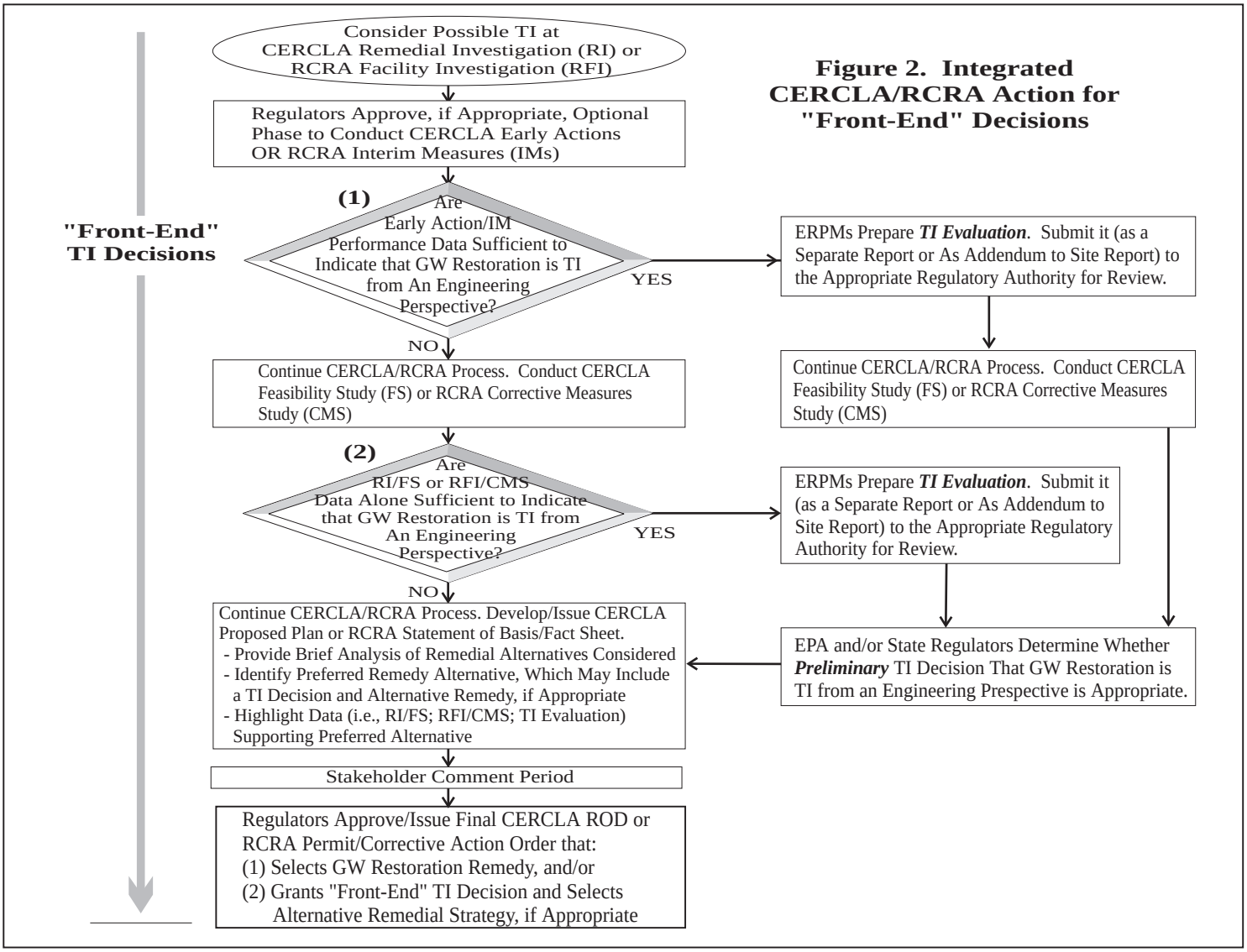


Figure 2. Integrated CERCLA/RCRA Action for "Front-End" Decisions

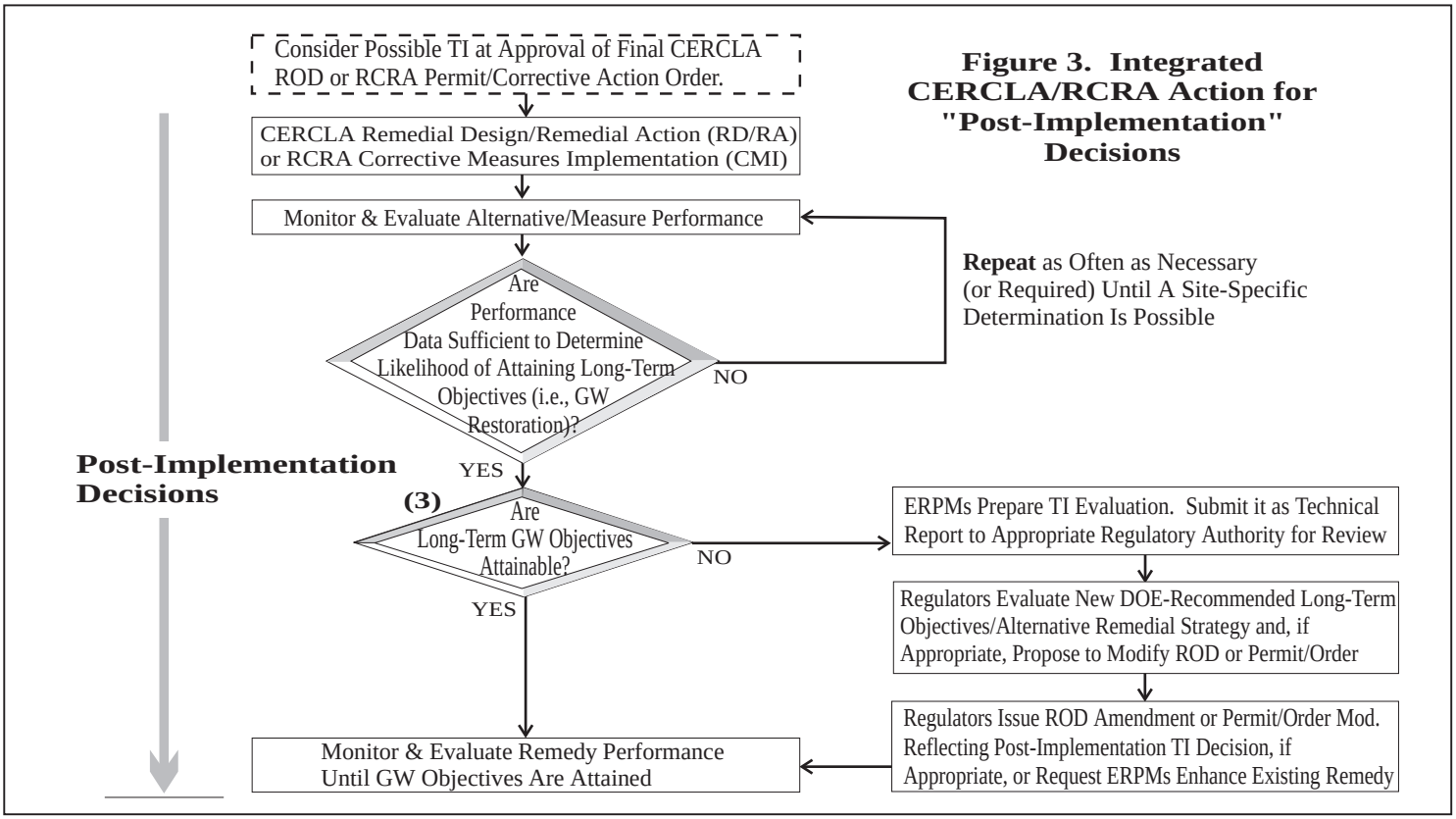


Figure 3. Integrated CERCLA/RCRA Action for "Post-Implementation" Decisions

When should Environmental Restoration Program Managers (ERPMs) begin considering whether attaining cleanup levels for ground water may be technically impracticable?

The possibility that attaining cleanup levels could be technically impracticable should be evaluated throughout the remediation process for both CERCLA and RCRA -- from the early stages of developing a conceptual site model through ***all*** stages of remedy implementation. Regulators can make TI decisions as soon as ERPMs provide clear and convincing information demonstrating that such a finding is warranted. As illustrated in Figures 2 and 3, this generally will be at one of three points in the ground water restoration process:

1) A "front-end" TI decision [i.e., a decision that is presented for comment in a draft site decision document (e.g., CERCLA Proposed Plan, RCRA Statement of Basis)], based in part on pilot studies or the performance of CERCLA early actions or RCRA interim measures;
2) A front-end TI decision (again made before a final remedy decision document has been signed), based on CERCLA remedial investigation/feasibility study (RI/FS) or RCRA facility investigation (RFI)/corrective measures study (CMS) data alone; or
3) A post-implementation TI decision (i.e., post-ROD or post-permit/order) based on the ground water restoration remedy's performance.

Because it is often difficult to predict the effectiveness of remedies based on limited site characterization data alone, EPA believes that TI decisions can be made after pilot or full-scale ground water restoration systems are implemented (i.e., post-implementation decisions as described in number 3 above). However, data from remedy performance are not always necessary to justify an ARAR waiver due to TI. At the completion of the remedial investigation, site conditions may have been characterized to the extent necessary for the lead agency (i.e., DOE) to determine, and for EPA or authorized states to concur, that ground water restoration is technically impracticable from an engineering perspective (number 2 above).

[Reference 6] For example, a site conceptual model that synthesizes data acquired from historical research, site characterization, pilot studies, and CERCLA early actions or RCRA interim measures (IMs) conducted as part of a phased approach may indicate a subsurface, non-recoverable NAPL (e.g., DNAPL) is present in a complex geologic environment (e.g., heterogenous soil deposits or fractured bedrock) and is an ongoing source of dissolved-phase contamination. This would likely influence both the site investigation techniques and the options for ground water remediation. Moreover, since DNAPLs are the single greatest cause for TI decisions [Reference 2], their presence can serve as the foundation for requesting a "front-end" TI waiver.

A TI decision applies only for that portion of the contaminated ground water for which restoration is TI (e.g., the DNAPL zone). Remediation strategies, objectives, and cleanup levels may differ for different portions of a contaminant plume.

How is a phased approach implemented and integrated into assessing a site's restoration potential?

The restoration potential of a particular site may be highly uncertain, even after a relatively complete remedial investigation. By implementing a ground water remedy in more than one phase (as two separate actions or phasing of a single action), ERPMs can integrate performance data from an initial phase with site history and site characterization data to reduce this uncertainty, assess the site's restoration potential, and establish ***realistic*** long-term remedial objectives prior to selection of the "final" remedy. Moreover, if approached properly, phasing of activities should expedite, rather than lengthen or deter, the restoration process.

A phased approach strategy for contaminated ground water should identify (1) site problems amenable to early actions/IMs (e.g., plume containment), (2) the specific response authorities that will be used to support investigation of and response action for each

problem, (3) the planned timing of the response, and (4) issues associated with integrating information from the phased response into the TI Evaluation. ERPMs can document their phased approach strategy in an *Early Action Work Plan*, an appendix in or an addendum to an existing site report [e.g., Remedial Investigation (RI) Report], or in a DOE consensus memorandum. [Reference 7] The selected document will explicitly define for each early action/IM the exact site problem; strategic objectives; scope of the anticipated action(s); measure(s) of success; and issues associated with integrating the action with the RI/FS or remedial design/remedial action.

Table 1. Components of TI Evaluation Report *

Component	Description of Component
1. Specific ARARs	Identifies the specific ARARs for which the TI decision is being sought. Generally these should include only ARAR- or risk-based thresholds that are used to establish cleanup standards or levels. Factors EPA considers include: • the technical feasibility of restoring that portion of ground water in which the limiting contaminants (e.g., DNAPLs) are not present; and • the potential advantages of attaining cleanup levels for some of the contaminants.
2. TI Zone	Delineates on site maps and geologic cross-sections the horizontal and vertical extent of the area that is fixed in space for which the TI determination is sought, and should include both area and depth in absolute or relative terms. Avoid depicting the TI zone based on contaminant concentration contour intervals because they are highly interpretive and their position may change with time.
3. Conceptual Model	Synthesizes and presents the following information -- site description and history; geologic and hydrogeologic factors; contaminant sources and releases; and contaminant distribution, transport, and fate parameters -- that is based on and supported by interpretive graphics, reduced and analyzed data, subsurface investigation logs, and other pertinent characterization information. It should provide sufficient detail to define key site conditions and mechanisms that limit restoration potential; it should not consist of mathematical or computer models.
4. Evaluation of Restoration Potential	Demonstrates that source control measures have been or will be implemented to the extent practicable. Also offers an analysis of the suitability and performance of any ongoing or completed ground water remedial actions (including any enhancements), a predictive restoration time analysis which identifies assumptions and uncertainties, and a demonstration that no other conventional or innovative technologies can attain the cleanup levels within a reasonable time frame.
5. Cost Estimates	Estimates present worth of construction, operation, and maintenance costs, as well as costs for the continued operation of existing remedies or alternative remedial strategies. In cases where a TI waiver would update an existing ROD, estimates should identify potential ***cost savings*** of the update (gross cost savings for large sites with potentially large cost savings) or the proportion of total remedy cost (which fosters update opportunities for smaller sites with proportionately large reductions in cost), which EPA uses when establishing priorities for ROD reviews. [Reference 8] Finally, because the stage of a remedy's construction (i.e., whether a selected remedy is still in the design phase, or whether remedy construction is underway or already completed) can dramatically affect update costs, it may be desirable to illustrate DOE cost savings relative to a remedy implementation time line (i.e., the cost savings for TI decisions made at the design phase will be much greater than for TI decisions that occur during or following construction).

*SOURCE: Based on information appearing in References 1 and 8.

What site-specific information must be gathered and activities performed when ERPMs pursue a TI decision?

ERPMs are responsible for preparing the TI Evaluation that generally includes, in addition to any information or analyses EPA deems necessary, the information identified in Table 1. Determinations of TI, however, will be made by EPA or authorized states based on site-specific characterization and, when available, remedy performance data furnished by the ERPMs in support of their TI requests.

"Front-end" TI decisions (see numbers 1 and 2, page 4) require ERPMs to complete and submit clear and convincing information. This information should be based on studies that focus primarily on those data and analyses that define those limitations most critical to the effectiveness of ground water restoration technologies: contaminant source constraints (e.g., presence of DNAPLs) and geologic constraints. Contaminant source constraints include sites where the quantity, distribution, or properties of the NAPL render its removal from, or destruction within, the subsurface environment infeasible or inordinately expensive. Geologic constraints, such as the presence of complex fracturing of bedrock aquifers, also may critically limit the ability to restore an aquifer and may be defined sufficiently during characterization so that their impacts on a site's restoration potential are known with a relatively high degree of certainty.

In addition to components listed in Table 1, ERPMs need to provide information regarding their proposed alternative remedial strategy (or goals). Specifically, since EPA expects protectiveness to be maintained, ERPMs must illustrate that their proposed alternative remedial strategy is technically practicable and that it addresses three major expectations:

- Prevent exposure to contaminated ground water (e.g., employ institutional controls such as deed notifications and restrictions on water-supply well construction and use).
- Remediate or control the source [i.e., treat/remove source or prevent further migration of the plume by controlling the source using a physical barrier system (e.g., slurry wall) or a hydraulic containment system (typically pump-and-treat)].
- Evaluate further risk reduction measures [e.g., restore that portion of the aqueous plume that is outside of the containment area; establish and actively pursue throughout the plume (at CERCLA sites) site-specific cleanup levels that are as effective as possible, albeit less stringent than ARARs].

These expectations should be evaluated along with the nine remedy selection criteria for CERCLA actions[1] or the four general standards[2] and five remedy selection decision factors[3] for RCRA facilities, to determine the most appropriate alternative remedial strategy for a site.

A remedy that incorporates monitored natural attenuation may be considered as a viable alterative where a TI decision (e.g., TI ARAR waiver) is being sought, especially where DNAPLs are present in the subsurface and considerable site characterization data has been obtained. EPA has issued policy and guidance for cleanups at CERCLA and RCRA sites [Reference 9] on the acceptable inclusion of monitored natural attenuation as a remedy.

---

[1] Overall protection of human health and the environment (H.H.&E); compliance with ARARs; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; cost; state acceptance; and community acceptance. [40 CFR 300.430(e)(9)(iii)(A)-(I)]

[2] Overall protection of H.H.&E, attainment of media cleanup standards, source control, and appropriate management of remediation wastes. Proposed 40 CFR 264.525(a)

[3] Long-term reliability and effectiveness; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost. Proposed 40 CFR 264.525(b)

What are the major administrative responsibilities associated with "front-end" TI decisions and how are these decisions incorporated into the site-specific record?

As previously illustrated in Figure 2, an ERPM may elect to pursue a TI decision either: (1) based on pilot studies or the performance of CERCLA early actions or RCRA interim measures before the final remedy decision document has been signed; or (2) based on the results of a CERCLA RI/FS or RCRA RFI. Relative to CERCLA front-end TI decisions, DOE (acting as the lead agency) must prepare a Proposed Plan that notifies stakeholders of, and highlights the justification for, EPA's preliminary decision to waive the ARAR- or risk-based cleanup levels due to TI. It refers stakeholders to the administrative record, which is compiled and maintained by DOE, to review the supporting TI Evaluation. The evaluation typically consists of a stand-alone report or a section in/addendum to a site report (e.g., RI/FS). ERPMs will also, in coordination with the regulators, respond to any stakeholder comments concerning the proposed waiver. Final TI ARAR waiver decisions are documented in a final ROD that is entered into the administrative record upon signature and includes:

- the ARAR(s) that will not be attained,
- the waiver invoked (i.e., TI ARAR waiver), and
- the justification for invoking the waiver. [40 *CFR* 300.430(f)(5)(ii)(C)]

At RCRA corrective action facilities, front-end TI determinations are made by either the EPA Regional Administrator or by the state agency that is authorized to implement corrective action based on a request (e.g., permit modification request) and supporting data (i.e., TI Evaluation) furnished by an ERPM. Preliminary TI determinations and justification for these determinations are documented in a Statement of Basis document (EPA-lead) or a Fact Sheet (authorized state) for RCRA facilities seeking a permit, or in an initial RCRA section 3008(h) administrative order for corrective action for interim status facilities, all of which should refer stakeholders to documentation in the administrative record (e.g., CMS addendum) and to review the supporting TI Evaluation. Final front-end TI determinations at RCRA facilities are documented in the facility's final Hazardous Waste Management Permit or final administrative order for corrective action. In either case, the official record and docket is established and maintained by EPA or the authorized state.

Should existing Records of Decision/Hazardous Waste Management Permits be revisited and modified?

Even after a remedial strategy is selected and documented in a final ROD or permit/order, the Department can request an "update" (i.e., change/modification) of the site-specific cleanup strategy. Typically, requests are justified based on post-ROD or post-permit/order information concerning the characteristics or volume of contamination present and/or new expectations regarding the performance of selected technologies under site-specific conditions. Updates also may be made to reflect changes in state requirements (e.g., ARARs) that could not have been considered in the original decisions.

As part of its Superfund Reforms, EPA has undertaken efforts specifically designed to improve the cost-effectiveness of site remediation by recognizing and encouraging appropriate changes (i.e., updates) to remedy decisions to ensure these decisions reflect advances in remediation science and technology. Reform guidance primarily focuses on ground water sites and targets the following three principal types of changes: 1) changes in remediation technology employed, where a different technology would perform significantly better or result in a more cost-effective cleanup, *2) modifications of remediation objectives due to physical limitations posed by site conditions or the nature of the contamination* (emphasis added), and 3) modifications of the monitoring program to reduce sampling, analysis, and reporting requirements, where appropriate. [Reference 8]

Following implementation of the *selected* remedy, what site conditions could potentially prompt the modification of decision documents to reflect new information?

During implementation of the selected remedy, information gathered or developed during remedial design or remedial action/corrective measures implementation may identify trends in subsurface contaminant concentrations that provide a great deal of insight regarding the site's restoration potential and, in particular, whether achieving selected cleanup levels is technically practicable from an engineering perspective. In its September 1996 Superfund Reform guidance [Reference 8], EPA explicitly recognizes the two following scenarios as ideal candidates for reconsidering (i.e., "updating") remediation objectives:

- when DNAPLs have been directly identified or reliably inferred from information gathered during remedial design or remedial action/corrective measures implementation, or
- where an existing ground water remediation system has reduced contaminant levels, but contaminant recovery efficiency at the site or **portions** of the site is so low that a concentration "plateau" has effectively been reached. [Further guidance on defining concentration plateaus can be viewed in "Statistical Methods for Evaluating Cleanup Standards: Volume II, Ground Water" (EPA Publication 230-R-92-014, 1992).]

For the second of these, before reconsidering remediation objectives, ERPMs must ensure reasonable efforts have been made to refine or enhance existing remediation systems so that the loss of remedy efficiency can be attributed with relative confidence to physical limitations of the site (e.g., DNAPLs in complex geology) and not to inadequacy of the remediation system's design or its operation.

Although not explicitly addressed in the referenced memorandum, ERPMs at RCRA corrective action sites are encouraged to evaluate available information to ensure corrective measures and ground water cleanup levels selected in RCRA permits/orders reflect EPA's efforts to improve the cost-effectiveness of site remediation.

What administrative responsibilities are associated with modifying a site's decision document (e.g., ROD, RCRA permit) when pursuing a post-implementation TI decision?

When pursuing a post-implementation TI decision at CERCLA sites, unless either a TI waiver or contingent language indicating that a TI ARAR waiver may be invoked is included in the approved ROD, NCP regulations addressing post-ROD changes require the lead agency to consider a TI ARAR waiver only when all three of the following criteria are met [NCP 40 *CFR* 300.825(c)]:

1) The TI Evaluation contains significant information not contained elsewhere in the Administrative Record file,
2) The information could not have been submitted during the public comment period, and
3) The information substantially supports the need to significantly alter the scope of the response action (i.e., modify remediation objectives to reflect TI decisions and incorporate alternative remedy).

Upon submitting information that the regulators conclude satisfy these criteria, ERPM requests for CERCLA remedy updates will then be processed by EPA Regional personnel using the following three phases: 1) identification and prioritization of candidate RODs for review; 2) technical review (to determine whether changes to the remedy are warranted); and 3) implementation of the remedy update. [Reference 8] If the regulators make a preliminary determination that an update (e.g., TI waiver) is appropriate, ERPMs generally will be required to prepare a ROD amendment that addresses only the issue of technical impracticability and that portion of the remedy being changed, since a waiver of the selected remediation objectives typically constitutes a fundamental change. [Reference 1] In situations where a TI waiver or contingent language indicating that a TI ARAR waiver may be invoked **is included** in the approved ROD, an Explanation of Significant Differences (ESD) may be sufficient. Specifically, an ESD may be used where the revised remedy is generally consistent with the "alternative remedial strategy" discussed in the original ROD. That is, it may be appropriate when the original ROD (1) contains detailed discussions of the potential need

for a future TI waiver, and (2) identifies an alternative remedy strategy to be used in the event a TI waiver is determined to be appropriate for the site. If an ESD is determined to be sufficient, public notice and opportunity for comment should still be provided. [Reference 10]

At RCRA facilities, if, after a reasonable effort (which includes active efforts to achieve all permit requirements for RCRA corrective action), an ERPM determines that the corrective measure is incapable of meeting the permit/order-established media cleanup standards, the ERPM can submit a Class 3 permit modification request petitioning that EPA or the authorized state agency render a TI determination. If the facility is operating under an enforcement order or Federal Facility Compliance Agreement (FFCA), TI determinations generally are implemented through the negotiation of a new order/FFCA or an amendment to an existing order/FFCA. [Reference 1] Unlike CERCLA sites, ERPMs at RCRA facilities can submit permit/order modification requests at any time regardless of the underlying circumstances.

Regardless of the governing authority, post-implementation TI Evaluations should contain the same types of information and analyses as front-end decisions, except that remedy performance data and analysis should also be provided.

How long do TI Decisions remain in effect?

At CERCLA sites, revised cleanup levels and alternative remedial strategies remain in effect indefinitely provided the levels/strategies remain protective of human health and the environment. Because contaminants remaining at sites invoking TI ARAR waivers from cleanup levels are expected to be above levels that allow for unlimited use/unrestricted exposure, EPA retains its authority to conduct site-specific reviews. Reviews will begin no more than five years after initiation of remedial action and must be conducted at least once every five years [40 *CFR* 300.430(f)(4)(ii)], even after the site has been deleted from the National Priorities List. If a review indicates the alternative remedy is no longer protective, CERCLA section 121(c) states that EPA may take or require appropriate actions. New technologies could be considered where the existing remedy is not protective; however, the five-year review is not intended as an opportunity to consider alternatives to a selected remedy that continues to be protective of human health and the environment. [Reference 11]

RCRA TI determinations are incorporated into and serve as conditions of facility permits or corrective action orders and, therefore, remain in effect for the duration of each permit/order or until modified. During this period, TI determinations are subject to ongoing regulator oversight and review. EPA has clarified that TI determinations under RCRA do not relieve owners/operators of their ultimate responsibility of achieving media cleanup standards. Rather, if such a determination is made, but subsequent advances in corrective measures technology or changes in site conditions make achievement of the standards practicable, EPA reserves the authority to modify the permit or order, as appropriate. [Reference 2]

Questions of policy or questions requiring policy decisions will not be addressed in EH-413 Information Briefs unless that policy has already been established through appropriate documentation. Please refer questions concerning the CERCLA-related material covered in this Information Brief to:

Jerry DiCerbo, EH-413
Office of Environmental Policy & Assistance
RCRA/CERCLA Division, EH-413
U.S. Department of Energy
1000 Independence Ave., S.W.
Washington, DC 20585 at
(202) 586-5047
***gerald.dicerbo@eh.doe.gov**.*

Please refer any questions concerning the RCRA-related material covered herein to:

Jerry Coalgate, EH-413,
(202) 586-6075, or
***jerry.coalgate@eh.doe.gov**.*